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NASA TECH BRIEF

Goddard Space Flight Center

A Visual-Display and Storage Device

The problem:

Most display systems do not have an intrinsic memory capability; data must usually be stored in a buffer memory which continually refreshes the display. This arrangement is inefficient and expensive.

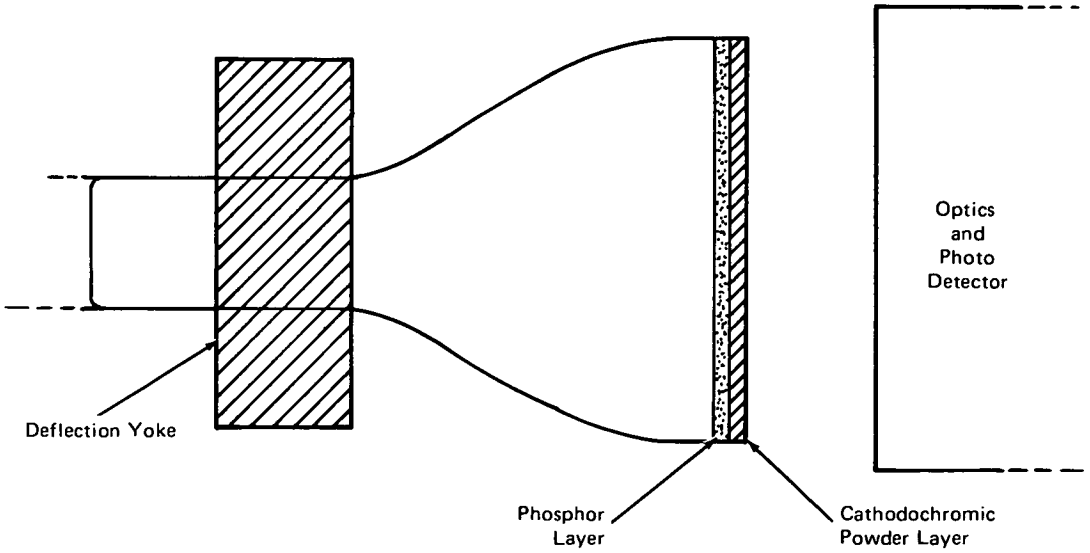
The solution:

A memory and display (MAD) device has been made which uses a cathodochromic material to store visual information and a fast phosphor to recall the information for display and electronic processing.

How it's done:

A cathodochromic material is one which will undergo a color change when it is bombarded with electrons; it is restored to its original color when exposed to light of the appropiate wavelength. The cathodochromic material used in this MAD is sodalite:Cl, an aluminosilicate with the composition $Na_8Al_6Si_6O_{24}Cl_2$. The display unit is depicted in the figure. The cathode ray tube electron beam is modulated by a video signal as it scans a normal TV raster. A highly visible color image with an induced optical density proportional to the electron beam intensity is stored in the sodalite layer.

The sensitive, phosphor layer is used to recover the stored image in the form of a reconstituted electronic video signal. A constant current electron beam scans the phosphor layer at an energy low enough to keep the electrons from reaching the sodalite layer. The phosphor then emits a uniform radiation. The materials are



Display and Storage Device

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chosen so that the colored portion of the sodalite layer absorbs radiation at the wavelength of the phosphor emission. In this way, the signal picked up by the external photodetector is directly related to the original video signal.

The MAD uses a 115-V, 60-Hz power line fused for 20A. A useful image can be stored in 1/30 second and kept for up to twenty-four hours. The image has 500 TV line resolution, and the contrast ratio is nearly 2:1.

The system can be modified to meet the requirements of a wide range of applications. It can be used to store and display computer generated data; if further processing is desirable, the data can be read and returned to the computer. In receiving telemetry signals, data may be stored in a single TV frame to be later regenerated and transmitted to other locations. The MAD could also be used in computer design, coherent optical processing, and many other applications.

Note:

Requests for further information may be directed to:

Technology Utilization Officer
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Code 207.1
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Patent status:

NASA has decided not to apply for a patent.

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